

## REMARKS

Claims 1-31, 33, 35, 37-41, 43-46, 48-51 and 53-58 are pending in the case.

The solicited claims have been amended to improve their readability without adding new matter and without affecting the scope thereof. Specifically, the word "respectively" has been omitted from Claims 2, 3, 13, 24, 44, 49 and 58. In addition, Claim 20 has been amended to clarify that the 50 wt% grain size of each of the phosphor powders is 0.5 to 10  $\mu\text{m}$  and that the specific surface area of each of the phosphor powders is 0.1 to 2  $\text{m}^2/\text{g}$ . Furthermore, we respectfully request entry of the amendment to Claim 35 in relation to the second occurrence of "the".

In response to the 35 U.S.C. §112, second paragraph rejection of Claims 35 and 44, we respectfully submit that reference to the substrate does not render the apparatus claims indefinite. As illustrated by Figures 1-4 and 8, the apparatus would not be operated without the substrate on which to apply the phosphor paste layer. As such, reference to the spaces between the barrier ribs is as accurate as the subject matter permits. Therefore, we respectfully submit that Claims 35 and 44 satisfy §112. *See Orthokinetics, Inc. v. Safety Travel Chairs, Inc.*, 1 U.S.P.Q.2d 1081 (Fed. Cir. 1986).

In response to paragraphs 6 and 7 of the Official Action, we respectfully submit that U.S. Patent No. 5,674,553 to Shinoda, et al. ('553) does not anticipate Claims 1-2, 4, 9, 16, 22 and 31 under 35 U.S.C. §102(e). The present invention as defined by Claims 1 and 2 encompasses a method for producing a plasma display wherein a substrate having a plurality of barrier ribs is coated with phosphor paste by a *paste applicator with outlet holes*. In sharp contrast, the method of the '553 patent involves *screen printing* of the substrate. *See* '553 patent, Column 19. As explained in the Specification at page 3, screen printing has the disadvantage that the screen is deformed upon repeated usage, resulting in decreased accuracy, thus making it difficult to obtain a highly precise plasma display and generating the added expense associated with routine replacement of the screen. As shown in Fig. 22A

of the '553 patent, the flat screen directly contacts the substrate barriers, and the paste is forced through the mesh using a "squeezer". The paste thus enters spaces between the barrier ribs, but is prevented from doing so therebetween by the barriers themselves. In the presently claimed method, however, the applicator is maintained some distance away from the substrate barriers during application of the phosphor paste. Additionally, the applicator of the present invention is not merely a mesh screen, but rather contains a plurality of outlet holes and several phosphor paste storage sections, as shown in the figures illustrating the present invention. The outlet holes are then so aligned that the paste is dispensed directly to the spaces between the barrier ribs. Therefore, since Claims 1, 2, 4, 9, 16, 22 and 31 are not drawn to a screen printing method, those claims are clearly distinguishable over the '553 patent.

In response to Paragraph 9 of the Official Action, we respectfully submit that the '553 patent does not render solicited Claims 3, 5-7, 11, 21, 26 or 30 obvious under 35 U.S.C. §103. The argument set forth in response to Paragraphs 6 and 7 of the Official Action applies equally in response to Paragraph 9. Additionally, we respectfully submit that the '553 patent fails to recognize that the width and pitch of the barrier ribs of the substrate are result-effective variables that control the resolution of the display panel. A variable may not be optimized through routine experimentation unless it is recognized in the prior art as a result-effective variable. The '553 patent also fails to recognize the number of outlet holes in the paste applicator as result-effective. Furthermore, the '553 patent fails to teach or even suggest the ratio by weight of phosphor powder to binder resin. The '553 patent also fails to recognize the component concentrations, barrier rib height, barrier rib pitch, and barrier rib width as result-effective. As such, those variables cannot be optimized through routine experimentation. Additionally, the '553 patent fails to teach or even suggest the equation of Claim 26. Since the '553 patent fails to teach or suggest all of the claim limitations of Claims 3, 5-7, 11, 21, 26 and 30, we respectfully submit those claims are patentably distinct.

In response to Paragraphs 10-21 of the Official Action, we respectfully submit that a prima facie case of obviousness under 35 U.S.C. §103 has not been established. According to 35 U.S.C. §103(a), “[a] patent may not be obtained...if the differences between the [claimed invention] and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art.” Hindsight analysis may not be employed to “pick and choose” elements to reconstruct the claimed invention. *In re Fine*, 5 U.S.P.Q.2d 1780, 1783 (Fed. Cir. 1988). The Federal Circuit recently announced in a year 2000 case that the best defense against hindsight-based obviousness analysis is the rigorous application of the requirement for a *showing* of a teaching or motivation to combine the prior art references.” *Ecolchem Inc. v. Southern Cal. Edison Co.*, 56 U.S.P.Q.2d 1065, 1073(Fed. Cir. 2000). Specific evidence of motivation to combine, as distinguished from conclusory statements, must be provided. *See id.* “The absence of a convincing discussion of the specific sources of the motivation to combine the prior art references...is a critical omission in obviousness analysis.” *Id.* at 1075. Further, a mere discussion of the ways that elements of multiple prior art references can be combined to construct the claimed invention is insufficient. *Id.* at 1075-76.

In the present case, the Applicants’ disclosure has been used as a blueprint for piecing together select elements of the prior art to achieve the claimed invention. It would be in error to make conclusory statements that it would have been obvious to combine select elements of the cited prior art to achieve the method or apparatus of the solicited claims. Even if the individual components of the claimed invention were known, which is true of almost any valid patent, that fact alone is not sufficient to establish a prima facie case of obviousness. There must be an *objective reason* to combine the teachings of the references. “Obvious to try” is not the proper standard under §103.

In light of the lack of motivation to combine the cited references, we respectfully submit that the solicited claims are nonobvious.

In further response to Paragraphs 10 and 17 of the Official Action, we respectfully submit that the U.S. Patent No. 5,227,840 to Osaka, et al. ('840) teaches away from any hypothetical combination to achieve the present invention. As explained above, the present invention relates to a method and apparatus for making a plasma display that is far improved over the conventional screenprinting method. The '840 patent, however, relates to a paste for *screenprinting a cathode ray tube substrate*. See '840 at Col. 3 and 7. Thus, it would not have been obvious to one having skill in the art to employ the paste properties of the '840 patent related to a cathode ray tube to achieve the method and apparatus for producing a *plasma display* of the present invention.

In further response to Paragraphs 3-15, 20 and 21 of the Official Action, we respectfully submit that it is not well-known in the art of plasma displays that the length diameter ratio of a nozzle affects its dispensing efficiency. U.S. Patent 5,656,574 to Raul-Chandar, et al. ('574) is nonanalogous art and thus cannot be relied upon for such an assertion. "To rely on a reference under 35 U.S.C. §103, it must be analogous prior art". MPEP §2141.01(a). While the present invention relates to a method and apparatus for producing a *plasma display*, the '574 patent relates to superconducting *wires and rods*. Therefore, it would not have been obvious to a person having skill in the art at the time the invention was made to employ the teachings of the '574 patent with prior art analogous to the present invention to achieve the claimed method and apparatus. Thus, we respectfully traverse the statement that it was known in the art that the length to diameter ratio of a nozzle affects its dispensing efficiency.

Furthermore, we respectfully submit in response to Paragraphs 15 and 16 that U.S. Patent No. 4,775,080 to Mettenbrink ('080) is non-analogous art. The present invention relates to a method and apparatus for producing a plasma display. In sharp contrast, the '080 relates to a *toothpaste dispenser*. Thus the level of skill in the art at the time of the present invention does not include knowledge of the '080 patent.


In further response to paragraph 18, we respectfully submit that U.S. Patent No. 4,792,723 to Igarashi, et al. ('723) teaches away from any hypothetical combination to achieve the present invention, as it teaches a screenprinting method having the disadvantages previously discussed. As such, the '723 patent does not establish a prima facie case of obviousness with respect to Claim 23.

Furthermore, we respectfully submit that U.S. Patent No. 5,850,241 to Silverbrook ('241) does not establish a prima facie case of obviousness with respect to Claims 45 and 46. The '241 patent relates to *computer controlled printing devices*, a field which is not even remotely analogous to the field of the present invention. Thus, the level of skill in the art at the time of the invention did not include the disclosure of the '241 patent. In addition, we respectfully traverse the unsupported assertion that "fluororesins are notoriously well-known hydrophobic coatings".

In view of the non-combinability of U.S. Patent No. 5,921,836 to Nanto, et al. ('836), we respectfully submit that the Examiner's arguments in response to the Amendment and Argument submitted on December 26, 2000 are moot.

In light of the foregoing discussion, we respectfully request withdrawal from the cited references and urge early allowance of the solicited claims.

Respectfully submitted,

  
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**In the Claims** (clean copy as amended)

Kindly amend the claims as follows:

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210

2. (Twice Amended) A method for producing a plasma display, comprising the steps of coating a substrate with a plurality of barrier ribs, with three phosphor pastes each containing a phosphor powder emitting light of red, green or blue, as stripes in the spaces between the respectively adjacent barrier ribs, from a paste applicator with outlet holes, and heating to form a phosphor layer, wherein the lateral side wall thickness (T1) of the phosphor layer at the position corresponding to a half of the height of each barrier rib and the bottom wall thickness (T2) of the phosphor layer satisfy the following relation:

$$10 \leq T1 \leq 50 \mu\text{m}$$

$$10 \leq T2 \leq 50 \mu\text{m}$$

$$0.2 \leq T1/T2 \leq 5.$$

3. (Amended) A method for producing a plasma display, according to claim 1 or 2, wherein a space (S) between adjacent barrier ribs and the average diameter (D) of the outlet holes satisfy the following formula:

$$10 \mu\text{m} \leq D \leq S \leq 500 \mu\text{m}.$$

Sub  
211

7. (Amended) A method for producing a plasma display, according to claim 1 or 2, wherein the paste applicator has  $16n \pm 5$  (n is a natural number) outlet holes.

Sub  
212

12. (Amended) A method for producing a plasma display, according to claim 1 or 2, wherein the phosphor pastes are applied while the distance between the top surfaces of the barrier ribs formed on a glass substrate and the tips of the outlet holes of the paste applicator is kept at 0.01 to 2 mm.

13. (Amended) A method for producing a plasma display, according to claim 1 or 2, wherein said phosphor pastes capable of emitting different colors are discharged from one paste applicator, and the shortest distance between the outlet holes applying phosphor pastes mutually different in color is 600  $\mu\text{m}$  or more.

Sub 13  
24

20. (Twice Amended) A method for producing a plasma display, according to Claim 1 or 2, wherein 50 wt% grain size of each of the phosphor powders is 0.5 to 10  $\mu\text{m}$  and wherein specific surface area of each of the phosphor powders is 0.1 to 2  $\text{m}^2/\text{g}$ .

Sub 14  
25

24. (Amended) A method for producing a plasma display in which three phosphor pastes each comprising a phosphor powder emitting light of red, green or blue are applied to the spaces between adjacent barrier ribs on a glass substrate, to form a phosphor plane, according to claim 2, wherein phosphor paste existing outside predetermined coating positions are removed by adhering said phosphor paste to an adhesive material.

25. (Amended) A method for producing a plasma display, according to claim 1 or 2, wherein phosphor paste deposited at top surfaces of the barrier ribs is removed by adhering said phosphor paste to an adhesive material.

Sub 15  
26

29. (Amended) A method for producing a plasma display, according to claim 28, wherein each of the photosensitive phosphor pastes have the following composition:

Organic component	: 15 ~ 60 parts by weight
Phosphor powder	: 40 ~ 85 parts by weight
Solvent	: 10 ~ 50 parts by weight.

30. (Amended) A method for producing a plasma display, according to claim 1 or 2, wherein the barrier ribs are provided as stripes with the following dimensions:

Pitch	: 100 ~ 250 $\mu\text{m}$
Width	: 15 ~ 40 $\mu\text{m}$
Height	: 60 ~ 170 $\mu\text{m}$ .

Sub 16  
27

33. (Twice Amended) An apparatus for producing a plasma display, comprising a table for fixing a substrate with a plurality of barrier ribs formed on the surface, a paste applicator with a plurality of outlet holes to face the barrier ribs of the substrate wherein the average diameter (D) of the outlet holes of the paste applicator and the length (L) of each of the outlet holes satisfy the following relation:

$L/D = 0.1 \sim 600;$

Sub 10/16  
CA  
Cmald

a phosphor paste supply operatively connected to the paste applicator, and a moving actuator for three-dimensionally moving the table and the paste applicator relative to each other; and a positioning controller operative and effective to adjust the angle of inclination of the paste applicator to top surfaces of the barrier ribs of the substrate, while keeping tips of the outlet holes of the paste applicator at a predetermined distance from the barrier ribs of the substrate.

35. (Amended) An apparatus for producing a plasma display, according to claim 33, wherein the outlet holes of the paste applicator are not circularly formed, and the length (B) of each of the holes almost perpendicular to the barrier ribs and a space (S) between the adjacent barrier ribs satisfy the following relation:

$10 \mu\text{m} \leq B \leq S \leq 500 \mu\text{m}.$

44. (Amended) An apparatus for producing a plasma display, according to claim 33, wherein the centers of the outlet holes of the paste applicator are located above the spaces between the adjacent barrier ribs.

49. (Twice Amended) An apparatus for producing a plasma display, according to claim 33, wherein a plurality of paste applicators are provided for different phosphor pastes, and a plurality of phosphor paste supply devices are provided to supply the phosphor pastes for the respective paste applicators, so that spaces between the barrier ribs of the substrate may be simultaneously coated with the plurality of phosphor pastes.

51. (Twice Amended) An apparatus for producing a plasma display, according to claim 33, wherein a detecting means for detecting the positions of the outlet holes of the paste applicator, a detecting means for detecting the positions of the barrier ribs or the spaces between the barrier ribs of the substrate, a detecting means for detecting the position of top surfaces of the barrier ribs on the substrate, a detecting means for detecting the position of tips of the outlet holes of the paste applicator and a control means for controlling the start



*Consistent*  
and end of applying of the phosphor paste in response to the relative position between the outlet holes of the paste applicator and the substrate are provided.

*2/12*  
*2021*  
55. (Twice Amended) An apparatus for producing a plasma display, according to claim 33, wherein a reference mark detecting means for detecting a reference mark on the substrate, and a moving means and control means for moving the paste applicator and the barrier ribs relative to each other so that the outlet holes of the paste applicator may be located above spaces between the barrier ribs to be coated with the phosphor paste are provided.

*2/12*  
*2021*  
58. (Twice Amended) An apparatus for producing a plasma display, comprising three coating devices provided in series to respond to three phosphor pastes said coating devices each equipped with a table for fixing a substrate with barrier ribs, a paste applicator with a plurality of outlet holes to face the barrier ribs of the substrate, a supply means for supplying phosphor pastes to the paste applicator, and a moving means for three-dimensionally moving the table and the paste applicator relative to each other.